INTRODUCTION

The 2004 Virginia Water Quality Assessment Integrated Report is a summary of the water quality conditions in Virginia during the past five years (January 1, 1998 – December 31, 2002). This report, compiled by the Department of Environmental Quality (DEQ) with the assistance of the Department of Conservation and Recreation (DCR), is submitted to the Environmental Protection Agency and Congress to satisfy the federal reporting requirements under Section 305(b) and Section 303(d) of the Clean Water Act.

Summary information on water quality and the various programs developed by the DCR, DEQ and other federal, state and local agencies to assess and protect water quality and human health have been incorporated in this report as well as assessment data provided by citizen volunteers. Detailed monitoring station and sampling information for the nine river basins found in Virginia has been developed as a separate document and can be found on the DEQ water webpage at www.deq.state.va.us/water. This information includes the river basin sampled, the monitoring station identification, the parameter(s) sampled, assessment results and any associated comments. Additional information concerning specific stations or the data presented in this report can be retrieved upon request by contacting the DEQ's central office, local regional offices or visiting the DEQ water monitoring webpage at www.deq.state.va.us/watermonitoring/

Many aspects of this assessment process are the same as previous assessments but several changes or enhancements have been implemented for this reporting period, which are different from previous assessments. First and foremost, the overall assessment of water quality, once again, incorporates a five-year period. Earlier assessments had been based on a two-year period which made it very difficult to accurately assess water quality because the number of sampling data points available were limited. By going to a five-year assessment period, more data points are available and a better analysis of the data can be performed. The main change for this 2004 cycle involves the full incorporation of an integrated 305(b) and 303(d) report. EPA has developed five main categories with several subcategories for an overall rating of each segment or assessment unit. The overall categories are fully supporting all designated uses (Category 1), fully supporting some designated uses but unknown or insufficient information regarding the other designated uses (Category 2), insufficient information to determine if the uses are being met (Category 3) and the last two categories are related to the impaired waters. Category 4 are those waters that are impaired or threatened but do not need a Total Maximum Daily Load (TMDL). These are waters that already have an approved TMDL but still not meeting Standards (Category 4A), waters that have other control mechanisms in place which are reasonably expected to return the water to meeting designated uses (Category 4B) and those waters that have been determined to be impaired by pollution or other natural factors (Category 4C). Finally, Category 5 are those waters that have been assessed impaired and most likely need a TMDL. Virginia has further subcategorized the five EPA categories into several subcategories for better tracking of certain waters for additional follow-up monitoring or other agency tracking needs. It should be noted that EPA Category 4B and Virginia Category 5E was created to track water quality effluent limited waters affected by point source discharges that have compliance schedules. There is no impaired mileage or size associated with these facilities. However, if the discharge is causing impairment to receiving waters, the receiving water and associated miles would be listed as impaired and the source of impairment would be the facility. Additional information regarding this new categorization and other associated assessment methodologies can be found in Chapter 2.2 of this report and/or the 2004 Assessment Guidance Manual found on the DEQ water website at www.deq.state.va.us/wqa.

Another change for 2004 assessment cycle is “fully supporting but threatened” category has not been used in this report. EPA defines threatened waters as those waters that are predicted to not meet WQ Standards during the next 305(b) reporting cycle and therefore considered needing a TMDL. DEQ believes impairment should be confirmed by monitoring data that is compared to Water Quality Standards criteria prior to any listing for TMDL development. For this assessment, DEQ has designated waters that do not have a confirmed impairment due to the lack of a Water Quality Standard or has only a single exceedence of a Standard as fully supporting but have “observed effects” or “waters of concern”. These waters are categorized in Virginia’s Subcategory 2B. This category also includes waters exceeding nutrient and/or sediment screening values or waters where a single exceedence of a human health or aquatic life toxic criteria (9 VAC 25-260-140 B) has been observed. Additionally, a slightly impaired or unconfirmed moderate impaired benthic assessment rating as well as shellfish waters with temporary harvesting restrictions are considered fully supporting with observed effects for aquatic life and shellfish consumption respectively. Finally, citizen monitoring data that has not received full approval for designated use determination but indicate exceedences of Water Quality Standards are considered insufficient for overall use determination but having observed effects. These waters are captured in Virginia’s Subcategory 3C. Additionally, those insufficient waters that indicate full support are placed in Virginia’s Subcategory 3D. Virginia considers waters with observed effects to be “waters of concern” and should be prioritized for follow-up monitoring.

An important modification to the 2004 assessment is the inclusion of estuarine benthic and toxic review of water quality. The Chesapeake Bay Program (CBP) has been very active in sampling and analyzing estuarine waters and has provided DEQ with data for assessment review. EPA has directed Virginia and the state of Maryland to work together to develop a method to assess the random benthic index of biological indicators (B-IBI) collected by the CBP. Random benthic samples were collected baywide and the results were compared to benthic reference sites determined to be minimally impacted by anthropogenic activities. It is necessary to compare random sites to reference sites within the same strata. Seven habitat strata have been identified based on salinity and sediment type. These habitat strata are tidal freshwater, oligohaline, low mesohaline, high mesohaline mud, high mesohaline sand, polyhaline mud, and polyhaline sand. Each sample is collected and scored based on the habitat type using the Chesapeake Bay Benthic Index of Biotic Integrity. Bay and tributary segments have been created using the Chesapeake Bay segmentation scheme and all samples collected during the assessment period are grouped together and placed into one of four categories based on the B-IBI score (>4.0, 3.1-4.0, 2.1-3.0 and <2.0). The Baywide restoration goal for all waters are B-IBI scores > 3.0. Once all scores for a segment are grouped, they are statistically ranked using the Wilcoxan rank sum test using the Proc-StatXact 5 for SAS users (Cytel software). Where degraded conditions (<3.0) have been detected, the segment was assessed as impaired.

As in 2002, the 2004 fish tissue assessment has deemed 2 or more exceedences of the same toxic criterion based tissue value (TV) at a site may be assessed as impaired since the TV's are directly calculated from the "human health" Water Quality Criteria for Surface Waters (9 VAC 25-260-140). For additional information regarding fish tissue assessment, see Section 6.5.2 of the Water Quality Assessment Guidance Manual.

Equally important for the 2004 assessment is the inclusion of non-DEQ water quality data. While quality assurance and quality control (QA/QC) continues to be a concern for direct use of outside data, DEQ has made a considerable effort to improve the data quality of outside providers by reviewing monitoring protocols and suggesting means for improving data quality. The goal of this effort is to certify additional non-DEQ QA/QC QA/QC data for designated use determination in the overall statewide water quality assessment.

In addition to the previously described enhancements, revisions to the 305(b)/303(d) guidance manual have enhanced assessment quality and consistency among DEQ offices and programs and provides the public with assessment criteria used to determine designated use attainment. The revised manual has been public noticed and DEQ has received numerous comments on the initial updated draft manual. Additional revisions have been made to the guidance manual based on comments received. DEQ re-released the revised manual, based on the original comments, for a second public review. The 2004 Assessment Guidance Manual can be found on the DEQ website at: www.deq.state.va.us/wqa/

In July 1997, DEQ established the Water Quality Monitoring Task Force. The purpose of the Task Force was to update the water monitoring strategy to conform to the requirements of the Water Quality Monitoring, Information, and Restoration Act of 1997. The Task Force analyzed the current operational plans of the various monitoring programs within DEQ and has begun implementation of the new monitoring strategy. The outcome of this strategy will be consistent station siting, greater stream mile coverage, and expanded pollutant analyses so overall water quality can be determined within specific and easily identifiable, geographically defined water segments.

Additionally, EPA has developed a national water quality monitoring strategy that focuses on 10 elements of a water monitoring program for implementation during the next 10 years. The goal of this strategy is to better coordinate all federal, state and local monitoring programs and the subsequent data collected throughout the country in order to provide a better picture on the conditions of all waters nationwide. One of the primary features of the strategy is increasing the monitoring coverage within each state and territory. As previously stated, in order to assist in the goal of increasing the number of stream miles monitored, DEQ's citizen volunteer monitoring program has greatly increased the role of coordinating the monitoring activities of participating volunteer groups. Consistent quality control practices and quality assurance procedures within the volunteer monitoring programs help ensure the creditability and precision of the volunteer data for use in the "monitored data" assessment process. Additionally, DEQ has contacted the Virginia Water Monitoring Council, a consortium of water data generators in the state, to assist with soliciting additional federal, state and/or local monitoring data for use in future water quality assessments.

Alternative station siting selection criteria are also being implemented using probabilistic monitoring designs as well as rotating stations within watersheds as a basis for expanding river miles monitored. Historical monitoring station selection is being used for trend analysis and special studies, associated with the

Total Maximum Daily Load (TMDL) program, are being used to “focus” monitoring in specific waters that have been identified as impaired for one or more designated uses.

Expanded pollutant analysis is being conducted using new techniques developed by DEQ. These include clean metals monitoring, additional pathogenic bacteria monitoring, trace organic compound(s) analysis in whole water column and new chlorophyll a filter sampling analysis. As part of the free-flowing probabilistic monitoring program, stream habitat is being analyzed to determine if benthic habitat is being negatively affected. Additionally, DEQ now deploys semi-permeable membrane devices (SPMDs) at random sites across Virginia to screen waters for organic toxic pollutants.

Finally, DEQ and DCR, with inputs from other federal, state, local and citizen stakeholders, have continued a cooperative effort to schedule and develop TMDL’s for waters not meeting Water Quality Standards. These efforts will result in the development of pollutant “load allocations” which upon implementation, will ultimately allow these waters to return to fully supporting all designated uses.

For more information relating to water quality programs and initiatives visit the DEQ website at www.deq.state.va.us/water/.